

## CLAIMS

We claim:

1. A method of identifying bacteria, comprising:
  - a) providing:
    - i) genomic sequences from a plurality of bacterial species arrayed on a solid support so as to create a plurality of arrayed elements, and
    - ii) labeled target DNA from a test bacteria of interest, and
    - iii) labeled reference DNA from the strains of bacteria represented on said solid support;
  - b) hybridizing said target and reference DNA to said arrayed sequences to produce a hybridization pattern, wherein each hybridized DNA in said hybridization pattern has a signal;
  - c) calculating the ratio of each hybridization signal intensity at each array element to determine the identity of said test bacteria.
2. The method of Claim 1, wherein said test bacteria are from a sample obtained from a subject.
3. The method of Claim 1, wherein said test bacteria are pathogenic organisms.
4. The method of Claim 1, wherein said test bacteria are environmental isolates.
5. The method of Claim 1, wherein said solid support is a microchip.

6. The method of Claim 1, wherein said calculating comprises statistical analysis.

7. The method of Claim 1, wherein said signal comprises fluorescence.

5 8. The method of Claim 1, further comprising the step of producing hybridization profiles of said test and reference bacteria.

10 9. A method of identifying bacteria, comprising:

a) providing:

i) genomic sequences from a plurality of bacterial species arrayed on at least one microchip, so as to create a plurality of arrayed elements, and  
ii) labeled target DNA from a test bacteria of interest, and  
iii) labeled reference DNA from the strains of bacteria represented on said at least one microchip;

15 b) hybridizing said target and reference DNA to said arrayed sequences to produce a hybridization pattern, wherein each hybridized DNA in said hybridization pattern has a signal;  
c) calculating the ratio of each hybridization signal intensity at each array element to determine the identity of said test bacteria.

20 10. The method of Claim 9, wherein said test bacteria are from a sample obtained from a subject.

11. The method of Claim 10, wherein said test bacteria are pathogenic organisms.

12. The method of Claim 9, wherein said test bacteria are environmental isolates.

13. The method of Claim 9, further comprising the step of producing hybridization profiles of said test and reference bacteria.

14. The method of Claim 9, wherein said calculating comprises statistical analysis.

5 15. The method of Claim 9, wherein said signal comprises fluorescence.

16. A kit for identification of bacteria, comprising genomic sequences from a plurality of bacterial species arrayed on a solid support so as to create a plurality of arrayed elements, and labeled reference DNA from the strains of bacteria represented on said solid support.

10 17. The kit of Claim 16, wherein said solid support comprises at least one microchip.

18. The kit of Claim 16, wherein said labeled reference DNA is labeled with a fluorescent label.

15 19. The kit of Claim 16, wherein said reference DNA is obtained from organisms selected from the group consisting of pathogenic bacteria and environmental bacteria.

20. The kit of Claim 16, wherein said genomic sequences arrayed on said solid support are labeled.

20 21. The kit of Claim 20, wherein said genomic sequences arrayed on said solid support are labeled with a fluorescent label.